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EXAMINER	
RAMDHANIE, BOBBY	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)
	10/787,229	SHVETS ET AL.
	Examiner	Art Unit
	Bobby Ramdhanie, Ph.D.	1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 16 August 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-51 is/are pending in the application.

4a) Of the above claim(s) 41-51 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-40 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 27 February 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Claims 1-40 in the reply filed on 07/13/2007 is acknowledged. The traversal is on the ground(s) that a serious burden has not been placed on the examiner to consider all of the claims in a single application. This is not found persuasive because additional search would be required without restriction thereby resulting in a burden on the examiner.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4, 34, & 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Windolph (US6439068). Regarding Claim 1, teaches a method of monitoring and measuring the volume of a liquid droplet as it is being discharged from a liquid dispensing system comprising a nozzle having a dispensing tip (Figure 1), the method comprising: A). Using the liquid to form at least part of one of the three components of a capacitor, namely the dielectric and the two separate electrically conductive members (Column 2 lines 41-55 & Column 3 lines 7-14) and B). Measuring the change in capacitance in the capacitor so formed as the liquid is discharged from the nozzle

whereby the volume of liquid dispensed and the termination of the discharge is recorded (Column 1 line 57 to Column 2 line 55).

4. For Claim 4, Windolph teaches a method as recited in Claim 1 in which the liquid droplet forms a dielectric member positioned in the vicinity of the electrically conducting members of the capacitor and altering the effective constant of the capacitor (Column 3 line 59 – Column 4 lines 20). Examiner takes the position that the droplet makes up the dielectric of the capacitor. Examiner also takes the position that the variable R, the radius of the sphere, determines the capacitance of the droplet. As a result, as the radius is altered so is the effective dielectric constant of the capacitor.

5. For Claim 34, Windolph teaches a method of monitoring and measuring a liquid droplet as it is being discharged from a nozzle having a dispensing tip in which there is provided a capacitor and directing the liquid droplets into the vicinity of the capacitor whereby the dielectric constant for the capacitor is sufficiently changed to provide a measurable change in the capacitance sensed (Column 1 line 56 to Column 2 line 17).

6. For Claim 37, Windolph teaches a method of monitoring and measuring a liquid droplet as it is being discharged from a nozzle having a dispensing tip in which there is provided a chamber in the form of a capacitor comprising: A). Siting the tip within the chamber, and B). Measuring the change in capacitance as the liquid droplet is discharged whereby the volume of the liquid droplet dispensed and the termination of the discharge may be recorded (Column 1 line 61 to Column 2 line 4).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 2, 8, 9, 13, 14, 15, 18, 19, & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph in view of Suzuki (US4986099). Regarding Claim 2, Windolph teaches the method as recited in Claim 1. Windolph further teaches measuring the capacitance induced in an electrically conductive member sited adjacent the strip as the liquid is being discharged from the nozzle (Figure 1 High voltage converter). Windolph does not teach the steps are performed of electrically energizing the liquid with AC current. Suzuki teaches this feature (Column 2 lines 10-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Suzuki because according to Suzuki this would allow one of ordinary skill in the art to be notified when a low level is present in the dropper (Column 1 lines 29-37).

10. For Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph and Suzuki. Regarding Claim 8, Windolph teaches all of the claim limitations of Claim 1. Windolph further teaches the method of Claim 1 in which the volume of the liquid is calculated from both the change in capacitance and the charge carried by the liquid droplet (Column 1 line 61 to Column 2 line 4). Windolph does not teach the method of Claim 1 in which the liquid is energized with both AC and DC current. Suzuki teaches this feature. Suzuki teaches that a driving unit contains both an AC and DC current (Column 2 lines 21-30). It would have been obvious to one of ordinary skill in the art to modify Windolph with Suzuki because this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

11. Alternatively, Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph, Suzuki, and in further view of Levran et al (US5414609). Windolph teaches all of the claim limitations of Claim 1. Windolph does not teach the method of Claim 1 in which the liquid is energized with both AC and DC current. Suzuki and Levran et al teach this feature. Suzuki teaches that a driving unit contains both an AC and DC current (Column 2 lines 21-30). Levran et al teaches that the conversion of DC current to AC current is only 94-95% (Column 6 lines 38-44). It would have been obvious to one of ordinary skill in the art to modify Windolph with Suzuki and Levran et al because this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

12. For Claim 9, Windolph teaches all of the claims limitations of Claim 1. Windolph does not teach the method of Claim 8, in which the variance between the calculated

volumes exceeds a preset amount a possible malfunction is recorded. Suzuki teaches this feature (Column 1 lines 38-55). It would have been obvious to one of ordinary skill in the art at time the invention was made to modify Windolph with Suzuki because according to Suzuki, this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

13. For Claim 13, Windolph teaches the method according to Claim 1. Windolph further teaches the method of Claim 1 in which when the liquid is not being discharged from the apparatus, where the capacitance is measured and monitored on a change in capacitance being detected (Column 1 line 59 to Column 2 line 4). Windolph does not teach that the capacitance is measured and monitored to provide an indication of a possible leak in the apparatus. Suzuki teaches this feature. Suzuki teaches the use of measuring and monitoring a possible leak in the apparatus (Column 1 lines 29-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Suzuki because according to Suzuki, this would alleviate a patient from the constant visual confirmation that liquid remains inside of a dropper (Column 1 lines 18-26).

14. For Claim 14, Windolph teaches a method of monitoring and measuring liquid discharges from a nozzle having a dispensing tip comprising: A). Electrically energizing the liquid with current; and B). Measuring the capacitance induced in an electrically conductive member (Column 1 line 61 – Column 2 line 4). Windolph does not teach that the current is AC current. Suzuki teaches this feature. Suzuki teaches electrically energizing the liquid with AC current (Column 2 lines 38-49). It would have been

obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Suzuki because according to Suzuki when the AC current is applied to the liquid this allows the electrostatic capacity between the two electrodes to be compared with a reference level and a judgment signal representative of unfavorable results of this comparison to be sent to an annunciator (Column 1 lines 50-55).

15. For Claim 15, Windolph in combination with Suzuki teaches all of the claim limitation of Claim 14. Windolph further teaches that there is provided an electrode remote from and beneath the nozzle and electrode forming plates for the capacitor whereby the growth of a droplet on the dispensing tip increases the capacitance until it drops on detachment of the droplet from the dispensing tip (column 3 lines 47-50). Windolph does not teach the method of Claim 1, in which the liquid and nozzle are of high electrical conductivity. Suzuki teaches this feature. Suzuki teaches the use of a liquid that is highly electrically conductive (Column 2 lines 45-50). Neither Suzuki nor Windolph teach that the nozzle is made of a highly conductive material. Shvets et al teaches this feature. Shvets et al teaches the nozzle is made of a highly conductive material (Claim 18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a liquid and nozzle that are of high electrical conductivity because the capacitance of the liquid and the nozzle is of critical importance when attempting to determine the volume of the droplet since liquids and nozzles comprising low electrical conductivity will affect the capacitance and give an incorrect reading for the droplet.

16. For Claim 18, Windolph in combination with Suzuki, teach a method according to Claim 14. Windolph further teaches the method of Claim 14 in which the volume of the liquid is calculated from both the change in capacitance and the charge carried by the liquid droplet. Windolph does not teach the method of Claim 14 in which the liquid is energized with both AC and DC current. Suzuki teaches this feature. Suzuki teaches that a driving unit contains both an AC and DC current (Column 2 lines 21-30). It would have been obvious to one of ordinary skill in the art to modify Windolph with Suzuki because this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

17. For Claim 19, Windolph in combination with Suzuki teach all of the claim limitations of Claim 14. Windolph does not teach the method of Claim 8, in which the variance between the calculated volumes exceeds a preset amount a possible malfunction is recorded. Suzuki teaches this feature (Column 1 lines 38-55). It would have been obvious to one of ordinary skill in the art at time the invention was made to modify Windolph with Suzuki because according to Suzuki, this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

18. For Claim 23, Windolph in combination with Suzuki teach the method according to Claim 14. Windolph further teaches the method of Claim 14 in which when the liquid is not being discharged from the apparatus, where the capacitance is measured and monitored on a change in capacitance being detected (Column 1 line 59 to Column 2 line 4). Windolph does not teach that the capacitance is measured and monitored to provide an indication of a possible leak in the apparatus. Suzuki teaches this feature.

Suzuki teaches the use of measuring and monitoring a possible leak in the apparatus (Column 1 lines 29-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Suzuki because according to Suzuki, this would alleviate a patient from the constant visual confirmation that liquid remains inside of a dropper (Column 1 lines 18-26).

19. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph. Regarding Claim 5, Windolph teaches a method as recited in Claim 1. Windolph further teaches that there is provided an electrode remote from and beneath the nozzle and electrode forming plates for the capacitor whereby the growth of a droplet on the dispensing tip increases the capacitance until it drops on detachment of the droplet from the dispensing tip (column 3 lines 47-50). Windolph does not teach the method of Claim 1, in which the liquid and nozzle are of high electrical conductivity. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a liquid and nozzle that are of high electrical conductivity because measuring the changes in capacitance of the liquid droplet, to determine the volume of the droplet, will occur as a small change hence sensitivity to electrical changes is of great importance. One of ordinary skill in the art would know if an impure or low electrical conductive liquid is used, an incorrect capacitance would be obtained for the particular droplet size. It would be obvious to one skilled in the ordinary at the time the invention was made to modify the nozzle to be of a highly electrical conductive material because of the size of the droplet being so minute, that the electrical signal recorded will be extremely small in nature.

20. Claims 6, 7, 35, 38, & 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph in view of Riebel (US4706509). Regarding Claim 6, Windolph teaches all of the claim limitations of Claim 1. Windolph does not teach the method of Claim 1 in which when the liquid is a water based liquid, the liquid is energized at a carrying frequency (f_o) of between 100 KHz to 5 MHz. Riebel teaches this feature. Riebel teaches a method where the liquid is a water based liquid, (Column 1 lines 34-36 & Column 4 lines 15-24) the liquid is energized at a carrying frequency (f_o) of between 100 KHz to 5 MHz (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract). Examiner takes the position that if something is caustic, this relates to the hydrogen ion concentration of the substance, which is water dependent.

21. For Claim 7, Windolph teaches all of the claim limitations of Claim 1. Windolph does not teach the method of Claim 1 in which when the liquid is a water based liquid, the liquid is energized at a carrying frequency (f_o) of between 0.1 KHz and 1 MHz. Riebel teaches this feature (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel, this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract).

22. For Claim 35, Windolph teaches all of the claim limitations according to Claim 34. Windolph does not teach the method of Claim 34 in which the liquid is substantially

electrically non-conductive. Riebel teaches this feature. Riebel teaches a method of Claim 34 in which the liquid is substantially non-conductive (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel, other methods of measuring and monitoring droplets are non-responsive to substantially non-conductive suspensions (Column 1 lines 40-47).

23. For Claim 38, Windolph teaches all of the claim limitations according to Claim 37. Windolph does not teach the method of Claim 37 in which the liquid is substantially electrically nonconductive. Riebel teaches this feature. Riebel teaches a method of Claim 34 in which the liquid is substantially non-conductive (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel, other methods of measuring and monitoring droplets are non-responsive to substantially non-conductive suspensions (Column 1 lines 40-47).

24. For Claim 39, Windolph in combination with Riebel teach all of the claim limitations according to Claim 37. Windolph further teaches the method of Claim 37 in which the nozzle forms one o the conductors of the capacitor (Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel, other methods of measuring and monitoring droplets are non-responsive to substantially non-conductive suspensions (Column 1 lines 40-47).

25. Claims 10, 11, 12, & 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph in view of Shvets et al (EP1099484). Regarding Claim 10, Windolph teaches a method according to Claim 1. Windolph further teaches dispensing initially a plurality of droplets (Column 1 line 63), storing the data for subsequent use (Column 2 lines 59-64), and measuring the change of capacitance (Column 1 lines 63-67) Windolph does not teach the method of Claim 1 in which the initial calibration step is performed of weighing the droplets. Shvets et al teaches this feature. Shvets et al teaches the step in which the weighing if droplets using a Faraday pail is implemented [0058]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al in which the initial calibration step is performed of dispensing initially a plurality of droplets; measuring the change in capacitance; weighing the droplets; and storing the data for subsequent use because this would allow one to correlate the droplet size of known liquids measured by capacitance, with the weight of suspensions of these known liquids to determine what effect suspensions have on the capacitance of the liquid.

26. For Claim 11, Windolph teaches the method according to Claim 1. Windolph further teaches the formation of a droplet to determine the volume and other characteristics of the droplet (Column 2 lines 5-7). Windolph does not teach the method of Claim 1 in which the liquid is delivered from the nozzle in a continuous jet and the jet forms separate droplets remote from the dispensing tip while still maintaining the jet, the method further comprising measuring the change in capacitance caused by the jet immediately before and after the formation of a droplet to determine the volume and

other characteristics of the droplet. Shvets et al teaches this feature. Shvets et al teaches a method in which the liquid is delivered from the nozzle in a continuous jet and the jet forms separate droplets remote from the dispensing tip while still maintaining the jet ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

27. For Claim 12, Windolph in combination with Shvets et al teaches all of the claim limitations of Claim 11. Shvets et al further teaches the method of Claim 11 in which the information on the characteristics of the droplets is used to control the manner in which the jet is formed ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

28. For Claim 40, Windolph teaches all of the claim limitations according to Claim 37. Windolph further teaches dispensing initially a plurality of droplets (Column 1 line 63), storing the data for subsequent use (Column 2 lines 59-64), and measuring the change of capacitance (Column 1 lines 63-67) Windolph does not teach the method of Claim 37 in which the initial calibration step is performed of weighing the droplets. Shvets et al teaches this feature. Shvets et al teaches the step in which the weighing if droplets using a Faraday pail is implemented [0058]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al in which the initial calibration step is performed of dispensing initially a plurality of droplets; measuring the change in capacitance; weighing the droplets; and

storing the data for subsequent use because this would allow one to correlate the droplet size of known liquids measured by capacitance, with the weight of suspensions of these known liquids to determine what effect suspensions have on the capacitance of the liquid.

29. Claims 16, 17, 24, & 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph, Suzuki, and in further view of Riebel. Regarding Claim 16, Windolph and Suzuki teach all of the claim limitations of Claim 14. Windolph does not teach the method of Claim 14 in which when the liquid is a water based liquid, the liquid is energized at a carrying frequency (f_o) of between 100 KHz to 5 MHz. Riebel teaches this feature. Riebel teaches a method where the liquid is water based liquid, (Column 1 lines 34-36 & Column 4 lines 15-24) the liquid is energized at a carrying frequency (f_o) of between 100 KHz to 5 MHz (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract).

30. For Claim 17, Windolph and Suzuki teach all of the claim limitations of Claim 14. Windolph does not teach the method of Claim 14 in which when the liquid is a water based liquid, the liquid is energized at a carrying frequency (f_o) of between 100 KHz to 5 MHz. Riebel teaches this feature. Riebel teaches a method where the liquid is water based liquid, (Column 1 lines 34-36 & Column 4 lines 15-24) the liquid is energized at a carrying frequency (f_o) of between 0.1 KHz and 1 MHz (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made

to modify Windolph with Riebel because according to Riebel this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract).

31. For Claim 24, Windolph teaches a method of monitoring and measuring a liquid as it is being discharged from a nozzle having a dispensing tip comprising: A). Siting the nozzle with a conductive chamber having an outlet to allow the passing of the liquid there through from the nozzle dispensing tip (Figure 1); C). Measuring the capacitance induced by the interaction of the liquid and the chamber until the liquid detaches from the nozzle (Column 1 line 61 – Column 2 line 4). Windolph does not teach the method of monitoring and measuring liquid as it is being discharged from a nozzle having a dispensing tip comprising: B). Energizing the liquid being dispensed by applying a voltage at a preset carrying frequency (f_o). Suzuki teaches this feature. Suzuki teaches electrically energizing the liquid with AC current (Column 2 lines 38-49). Suzuki does not teach a preset carrying frequency (f_o). Riebel teaches this feature. Riebel teaches a method where the liquid is water based liquid, (Column 1 lines 34-36 & Column 4 lines 15-24) the liquid is energized at a carrying frequency (f_o) of between 0.1 KHz and 1 MHz (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph and Suzuki with Riebel because according to Riebel this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract).

32. For Claim 26, Windolph in combination with Suzuki and Riebel teach all of the claim limitations of Claim 24. Reibel further teaches a method where the liquid is water

based liquid, (Column 1 lines 34-36 & Column 4 lines 15-24) the liquid is energized at a carrying frequency (f_o) of between 100 KHz to 5 MHz (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph and Suzuki with Riebel because according to Riebel this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract).

33. For Claim 27, Windolph, Suzuki and Riebel teach all of the claim limitations of Claim 24. Riebel further teaches a method where the liquid is water based liquid, (Column 1 lines 34-36 & Column 4 lines 15-24) the liquid is energized at a carrying frequency (f_o) of between 0.1 KHz and 1 MHz (Column 2 lines 7-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Riebel because according to Riebel this method would allow for the measuring of solids concentration and particle size distribution in a suspension (Abstract).

34. For Claim 28, Windolph in combination with Suzuki and Riebel, teach a method according to Claim 24. Windolph further teaches the method of Claim 24 in which the volume of the liquid is calculated from both the change in capacitance and the charge carried by the liquid droplet. Windolph does not teach the method of Claim 24 in which the liquid is energized with both AC and DC current. Suzuki teaches this feature. Suzuki teaches that a driving unit contains both an AC and DC current (Column 2 lines 21-30). It would have been obvious to one of ordinary skill in the art to modify Windolph with

Suzuki because this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

35. For Claim 29, Windolph in combination with Suzuki and Riebel teach all of the claim limitations of Claim 24. Windolph does not teach the method of Claim 24, in which the variance between the calculated volumes exceeds a preset amount a possible malfunction is recorded. Suzuki teaches this feature (Column 1 lines 38-55). It would have been obvious to one of ordinary skill in the art at time the invention was made to modify Windolph with Suzuki and Riebel because according to Suzuki, this would allow one to be notified when a low liquid level is present (Column 2 lines 31-37).

36. Claims 20, 21, & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph, Suzuki, and in further view of Shvets et al. Regarding Claim 20, Windolph in combination with Suzuki teach all of the claim limitations according to Claim 14. Windolph further teaches dispensing initially a plurality of droplets (Column 1 line 63), storing the data for subsequent use (Column 2 lines 59-64), and measuring the change of capacitance (Column 1 lines 63-67) Windolph does not teach the method of Claim 1 in which the initial calibration step is performed of weighing the droplets nor does Windolph teach that the liquid is electrically energized with AC current. Shvets et al teaches this feature. Shvets et al teaches the step in which the weighing if droplets using a Faraday pail is implemented [0058]. Suzuki teaches the use of AC current of electrically energized the liquid. (Column 2 lines 38-49). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al in which the initial calibration step is performed of dispensing initially a

plurality of droplets; measuring the change in capacitance; weighing the droplets; storing the data for subsequent use, and with Suzuki for electrically energizing the liquid with AC current because this would allow one to correlate the droplet size of known liquids measured by capacitance, with the weight of suspensions of these known liquids to determine what effect suspensions have on the capacitance of the liquid.

37. For Claim 21, Windolph in combination with Suzuki teach all of the claim limitations of Claim 14. Windolph in combination with Suzuki does not teach the method of Claim 14 in which the liquid is delivered from the nozzle in a continuous jet and the jet forms separate droplets remote from the dispensing tip while still maintaining the jet, the method further comprising measuring the change in capacitance caused by the jet immediately before and after the formation of a droplet to determine the volume and other characteristics of the droplet. Shvets et al teaches this feature. Shvets et al teaches a method in which the liquid is delivered from the nozzle in a continuous jet and the jet forms separate droplets remote from the dispensing tip while still maintaining the jet ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph and Suzuki with Shvets et al because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

38. For Claim 22, Windolph, Suzuki, and Shvets et al teach all of the claim limitations of Claim 21. Shvets et al further teaches the method of Claim 21 in which the information on the characteristics of the droplets is used to control the manner in which the jet is formed ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph and Suzuki with Shvets et al

because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

39. Claims 25, 30, 30-33, & 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Windolph, Suzuki, Riebel, and in further view of Shvets et al. Regarding Claim 25, Windolph in combination with Suzuki and Riebel teach all of the claim limitations of Claim 24. Windolph further teaches that there is provided an electrode remote from and beneath the nozzle and electrode forming plates for the capacitor whereby the growth of a droplet on the dispensing tip increases the capacitance until it drops on detachment of the droplet from the dispensing tip (column 3 lines 47-50). Windolph does not teach the method of Claim 1, in which the liquid and nozzle are of high electrical conductivity. Suzuki teaches this feature. Suzuki teaches the use of a liquid that is highly electrically conductive (Column 2 lines 45-50). Windolph, Suzuki, nor Riebel teach that the nozzle is made of a highly conductive material. Shvets et al teaches this feature. Shvets et al teaches the nozzle is made of a highly conductive material (Claim 18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a liquid and nozzle that are of high electrical conductivity because the capacitance of the liquid and the needle is of critical importance when attempting to determine the volume of the droplet since liquids and nozzles comprising low electrical conductivity will affect the capacitance and give an incorrect reading for the droplet.

40. For Claim 30, Windolph, Suzuki, and Riebel teach all of the claim limitations of Claim 24. Windolph, Suzuki, and Riebel, further teaches dispensing initially a plurality

of droplets (Column 1 line 63), storing the data for subsequent use (Column 2 lines 59-64), and measuring the change of capacitance (Column 1 lines 63-67). Windolph, Suzuki, and Riebel do not teach the method of Claim 24 in which the initial calibration step is performed of weighing the droplets. Shvets et al teaches this feature. Shvets et al teaches the step in which the weighing of droplets using a Faraday pail is implemented [0058]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph, Suzuki, and Riebel with Shvets et al in which the initial calibration step is performed of dispensing initially a plurality of droplets; measuring the change in capacitance; weighing the droplets; and storing the data for subsequent use because this would allow one to correlate the droplet size of known liquids measured by capacitance, with the weight of suspensions of these known liquids to determine what effect suspensions have on the capacitance of the liquid.

41. For Claim 31, Windolph in combination with Suzuki and Riebel teach all of the claim limitations of Claim 24. Windolph further teaches the formation of a droplet to determine the volume and other characteristics of the droplet (Column 1 line 61 to Column 2 line 4). Windolph, Suzuki, and Riebel, do not teach the method of Claim 24 in which the liquid is delivered from the nozzle in a continuous jet and the jet forms separate droplets remote from the dispensing tip while still maintaining the jet, the method further comprising measuring the change in capacitance caused by the jet immediately before and after the formation of a droplet to determine the volume and other characteristics of the droplet. Shvets et al teaches this feature. Shvets et al teaches a method in which the liquid is delivered from the nozzle in a continuous jet and

the jet forms separate droplets remote from the dispensing tip while still maintaining the jet ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

42. For Claim 32, Windolph in combination with Suzuki, Riebel, and Shvets et al teach all of the claim limitations of Claim 31. Shvets et al further teaches the method of Claim 31 in which the information on the characteristics of the droplets is used to control the manner in which the jet is formed ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph, Suzuki, and Riebel with Shvets et al because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

43. For Claim 33, Windolph in combination with Suzuki, and Riebel and Shvets et al teach all of the claim limitations of Claim 24. Shvets et al further teaches a method in which the information on the characteristics of the droplets is used to control the manner in which the jet is formed ([0012]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al because according to Shvets et al, this is one of the oldest methods of creating droplets ([0012]).

44. For Claim 36, Windolph teaches all of the claim limitations according to Claim 34. Windolph further teaches a method as recited in Claim 34 in which the initial calibration step is performed of: dispensing initially a plurality of droplets (Column 1 line 63), measuring the change in capacitance (Column 1 lines 63-67), and storing the data for the subsequent use (Column 2 lines 59-64). Windolph. Suzuki, and Riebel do not teach

the method of Claim 34, in which the initial calibration step is performed of weighing the droplets. Shvets et al teaches this feature. Shvets et al teaches the step in which the weighing if droplets using a Faraday pail is implemented [0058]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Windolph with Shvets et al in which the initial calibration step is performed of dispensing initially a plurality of droplets; measuring the change in capacitance; weighing the droplets; and storing the data for subsequent use because this would allow one to correlate the droplet size of known liquids measured by capacitance, with the weight of suspensions of these known liquids to determine what effect suspensions have on the capacitance of the liquid.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bobby Ramdhanie, Ph.D. whose telephone number is 571-270-3240. The examiner can normally be reached on Mon-Fri 8-5 (Alt Fri off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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